Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_

**Soap Opera Genetics – Genetics to Resolve Family Arguments**

***I. How could our baby be an albino?***

**Did Tiffany have an affair?**

Tiffany and Joe have just had a baby and are very surprised to learn that their baby is albino with very pale skin and hair color. Joe is very angry. He tells his sister Vicky, "I think Tiffany had an affair with Frank! He’s the only albino we know. Obviously, Tiffany and I aren't albino, so Frank must be the father."

Luckily, Vicky is a biology teacher, so she explains how two parents with normal skin color could have an albino baby. She draws a Punnett Square to illustrate her explanation.

1. Draw a Punnett Square to show how two parents with normal skin color could have an albino baby. Use **a** for the recessive allele that can result in very pale skin and hair color and **A** for the dominant allele that results in normal skin and hair color.

**Why aren't more babies albino?**

By now, Joe has calmed down and he is getting interested. He asks Vicky "If that’s how it works, it seems as though a quarter of all babies should be albino. How come there are hardly any albino babies?"

2. What explanation should Vicky give to answer this question?

Joe is starting to feel guilty for getting so mad. He says "Geez, I feel like a jerk now. I should have known that Tiffany would never cheat on me."

**Will Tiffany and Joe's next baby be albino?**

Two years later, Tiffany is pregnant again, and she and Joe are discussing whether their second baby will be albino. Tiffany thinks the baby probably will be albino, but Joe remembers Vicky's explanation, and he tells Tiffany, "No, our second baby can't be albino because only one out of every four of our children should be albino. We already have one albino child, so our next three children should not be albino."

3. Is Joe right? Explain why or why not.

4. What is the probability that Tiffany and Joe's second baby will be albino? \_\_\_\_\_\_\_\_\_\_\_\_\_

***II. I don't want to have any daughters who are color blind like me!***

Frank and Awilda at Breakfast

Frank: Are you sure you want to wear that new shirt to work today? A green and red shirt like that would be better for Christmas, not for St. Patrick's Day.

Awilda: Oh no! Not again! I hate being color blind! I really thought this shirt was just different shades of green. Where's the red?

At Dinner That Night

Awilda: We should try to find a way to make sure we only have sons, no daughters. I don't want to have any daughters who might be color blind and have so many problems like I do. Color blindness wouldn't matter so much for a boy.

Frank: Remember, the doctor said that, since I'm not color blind, none of our daughters would be color blind, only our sons.

Awilda: I disagree. I think our daughters will be color blind like me and our sons will be normal like you.

Frank: No, the doctor said that the gene for color blindness is on the X chromosome, so only our sons will inherit your colorblindness.

Awilda: That doesn't make any sense. Girls have more X chromosomes than boys, so girls should be more likely to be color blind.

Help Frank to explain to Awilda why their sons will be color blind and their daughters will not be color blind by answering the following questions.

1. What are the genotypes of Awilda and Frank? (Since the allele for color blindness is located on the X chromosome, use the symbol Xcb for an X chromosome with the recessive allele for color blindness and XCB for an X chromosome with the dominant normal allele.)

Awilda: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Frank: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Draw the Punnett square for this couple and their children. In this Punnett Square, circle each daughter and use arrows to indicate any colorblind offspring.

3. Write an explanation to help Awilda understand why their sons will be colorblind even though their father has normal color vision.

4. Explain why their daughters will not be colorblind like their mother.

5. Explain why having two X chromosomes decreases a person’s risk of color blindness, instead of increasing her risk.